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Final Report

**Mammal, Bird and Herpetological Inventory of Chickasaw National
Recreation Area NPS**



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Background

Purpose of Inventory — As part of its biological inventory program the National Park Service (NPS) contracted with the Oklahoma Natural Heritage Inventory to conduct a formal and comprehensive mammal, bird, and herpetological inventory of Chickasaw National Recreation Area (CNRA), Oklahoma. The objective of this inventory is to positively identify 90% of the tetrapod vertebrates that inhabit CNRA. Pre-inventory lists of vertebrates suspected to occur in Murray County or South Central Oklahoma were compiled (Appendix 1). Although these lists undoubtedly contain more species than actually occur on the National Recreation Area, they were used to gauge inventory progress.

Park Description— The Platt District of the Chickasaw National Recreation Area (CNRA) was originally protected as Sulfur Springs Reservation in 1902 and then as Platt National Park in 1906. In 1976 the Platt National Park was connected with the federally owned land surrounding Lake of the Arbuckles (Arbuckle District) and designated the CNRA. The CNRA is currently 9,889 acres in size and hosted 1.5 million visitors in 2001. The area is situated approximately 120 km south of Oklahoma City adjacent to the town of Sulphur, in Murray County, OK. The three major creeks in the area, Rock, Buckhorn, and Guy Sandy Creek all flow into Lake of the Arbuckles' Reservoir, which is formed by a dam on Rock Creek.

The CNRA resides at the northern edge of the Arbuckle Mountains and primarily in the Osage Plains section of the Central Lowlands Physiographic Province. The CNRA is located in the Sub-tropical climatic zone with average July temperature of 28 C and January temperature of 3 C. Precipitation averages 98 cm per year. The vegetation of the CNRA was recently mapped by Hoagland et al. (2000). Hoagland (2000) indicated that the CNRA is dominated by forest (29% of area), herbaceous (19%) and woodland (17 %) vegetation types. The dominate woody species are post oak (*Quercus*) and eastern red cedar (*Juniperus*) and the dominant herbaceous cover is bluestem prairies. About 16 % of the area is covered by the Lake of the Arbuckles an additional 11% is in urban and rural development.

Inventory Methodology

General— Three biologists worked 5 days per week from the 15th of May through the 14th of August 2003 to trap, sight and record the locations of tetrapod vertebrates in the Chickasaw National Recreation Area. A fourth biologist also worked in the field on about 1 day per week on these surveys. In addition, two conservation interns spent several days in the spring of 2004 trapping in the recreation area and searching for species that were not detected in 2003. Unless otherwise noted all observations are from 2003. Approximately 220 days of person effort (person day = 1 person x 8 hrs of effort) were invested in field inventories. This effort was divided among multiple sampling techniques and sites in an effort to encounter the maximum number of species. These techniques included: nocturnal mist-netting, drift fence sampling, mammal live-trapping, point-count surveys for birds, nocturnal road cruising, turtle live-trapping, visual encounter surveys, cover board sampling, and camera stations. Sample locations were chosen to cover the variety of habitats in the recreation area. Sampling in some areas was minimized to reduce interactions with the public (e.g., visitor's center and trails). Within large areas of similar vegetation, traps were sampled concurrently to decrease the travel time among

sampling locations. Species not well-sampled by these methods were recorded as incidental observations when encountered. Because we were focused on maximizing the number of species detected, rather than estimating abundance, differences in number of detections of species are interpreted with caution. For example, fox squirrels (*Sciurus niger*) are common in the recreation area, yet they were not detected in our formal sampling methods. We did note their presence as an incidental encounter, but we made no effort to record every detection of this species. Similar undercounting of abundance likely occurs for most of the large common species we detected. Whenever possible photo vouchers were collected to verify the identity of encountered species (Appendix 1) and photographs were also taken at most sampling locations. Locations of all sampling sites were recorded with global position systems (Garmin GS 12). Because the United States Geological Survey Orthophoto Quadrat Maps for the Recreation Area use the 1927 North American Datum (NAD27), GPS locations were recorded using this projection.

Mammal Trapping Stations— The objective of mammal-trapping stations was to positively identify as many of the 25 mammal species previously collected from Murray County (Caire et al 1989; Appendix 1) in addition to any previously undocumented species. Toward this end, we used a variety of traps and baits to attract and capture mammals. We deployed both Sherman and tomahawk live traps. Traps were set either in clusters of 8 traps or spaced along transects. At each cluster there were 4 small Sherman traps (3 in x 3 in x 9 in) and 2 large Sherman traps (4 in x 5 in x 15 in) baited with seeds, oats, and peanut butter. These traps were used to catch rodents and were placed in microhabitats likely to be used by these small-bodied mammals with a 20m radius of a central point. Larger tomahawk traps (5 x 5 x 16 and 6 x 6 x 24) were used to catch medium-bodied mammals and were baited with fruit and meat. To reduce interference from medium-bodied mammals (mainly raccoons *Procyon lotor*), Sherman traps were separated from tomahawk traps by about 50m. Typically traps were operated for 4 nights at a station. Each trapping station was separated by at least 200 meters from other stations. Trapping areas were chosen to cover the variety of habitats in the recreation area. The number of stations used in each area depended on the acreage available for trapping (away from heavy public use areas). For these reasons, number of traps used varied among days (Figure 1). Traps were baited and set in the evening and were checked beginning at dawn. Captured mammals were identified, weighed, measured and released. If there had been uncertainty regarding the species identity of captured mammals that could not be resolved with photographic evidence, we were prepared to collect (i.e., kill) them. The only individuals for which we were uncertain of species identity were a few *Peromyscus* that were clearly either *P. leucopus* or *P. maniculatus*, but could not be clearly distinguished. We did not collect specimens of these species. Trapping stations were operated at 208 locations for a total of 4359 trap nights within the National Recreation Area between May 20 and August 11 2003 (Figure 2). Each mammal-trapping site was photographed to record the condition of the habitat at the time of sampling.



Point Counts— The Oklahoma Date Guide (Arterburn et al. 2000) lists 152 species as occurring in the south-central region of Oklahoma between May and August



(Appendix 1). The primary objective of point counts was to detect as many of these bird species as occur within the recreation area. Many of the species in the date guide, however, breed in habitats that do not exist in the CNRA or are migrant waterbirds that make little use of Lake of the Arbuckles. Each point was visited once and the count lasted 8 minutes within which all bird species seen or heard were recorded. Counts were made between dawn and 10 am. Each point was at least 200 meters from the next nearest point. Point counts were taken at 123 locations within the Chickasaw National Recreation Area between 20 May and 15 July 2003 (Figure 3).

Drift Fences— Drift fence trap arrays were established at 12 locations within Chickasaw National Recreation Area (Figure 4). These arrays consisted of a single plastic fence, with 4 small pitfall cups and 4 funnel traps. The primary objective of these arrays was to capture reptiles and amphibians. Drift fences were typically left at a given site for 4 days. A total of 141 fence nights of effort were used. The target list of reptiles from Murray County included 63 species of reptiles and 16 species of amphibians (Appendix 1).



Visual Encounter Surveys— Visual encounter surveys were active searches along transects. There were 106 visual encounter survey conducted during the summer of 2003 throughout the recreation area with a total search time of 37.5 hours. The starting and ending locations of the transect were GPSed (Figure 5) and the starting and ending times were recorded. Most visual encounter surveys were 100 m in length (61 of 106 were between 90 and 110 meters; overall mean = 120 meters). Because of great variety in terrain and ambient search conditions (i.e., climate), however some surveys were as short as 20 meters and others were as long as a kilometer. The primarily goal of these searches was to locate and positively identify species of reptiles and amphibians that were difficult to sample with other methods. Because species encountered with this sampling method were usually not captured, they were more difficult to voucher. As the biologist moved along a transect s/he actively turned cover objects (e.g., logs, rocks, debris) to exposed subterranean animals. Location of each uncommon (less than 10 records) reptile and amphibian encountered was GPSed.

Turtle Traps— A floating and two submerged turtle traps were placed in 16 pond and creek sites throughout the recreation area (Figure 6). Traps were baited with fish or other meat and were typically set at a given location for 4 days. A total of 135 trap days were used to capture turtles. Traps were checked daily throughout the trapping period.

Camera and Track Stations— 5 infrared motion-trip cameras (DeerCam Scouting Camera) were placed at 14 baited track stations to identify large mammals within the Chickasaw National Recreation Area (Figure 7). Cameras were placed at a given location for between 7 and 41 days (21 days on average) for a total of 285 camera nights. Locations of cameras were chosen based on habitat variation, logistical ease, and degree of public use. Tracking stations were comprised of a one-meter square piece of coated sheet metal. A hole was cut into the middle of the tracking



plate (2 in diameter), and PVC pipe (two inch diameter) was driven through the hole and into the ground to hold the tracking plate in place. The tracking plate is covered with a suspension of carpenter's chalk in alcohol. A kabob of raw meat was placed in top of the pipe at that center of the tracking plate, and other food items (primarily fruit) were placed around the base of the pipe for bait. When animals walk across the plate, they leave track evidence. Photographs of tracks may then be used as vouchers. No species were identified solely by tracks and all animals whose tracks were identified were captured on film. Cameras were set up next to the tracking plate, and with the bait in the viewfinder. When warm-blooded wildlife investigated the bait, an infrared sensor activated the camera.

Cover boards— Cover-board stations were established in May and cover boards remained in place until early August. At each station 2 plywood and 2 tin cover boards were placed within a 20m- diameter circle. Each cover board was 0.5m². Sampling was focused in 3 areas where public access was limited (Figure 8). These were the Upper Guy Sandy Area, Buckhorn Lake area, and Goddard Road east and west of the youth camp. Because of the low success of this sampling approach in these areas, we did not establish cover board stations in additional areas. To reduced the disturbance to animals who use cover-boards and to ensure that cover boards are not disturbed by the larger animals drawn to bait, cover boards were located at least 50 meters away from the nearest trapping station, and at least 100 meters away from the nearest camera and tracking plate station. Species that prefer dry microhabitats have been shown to prefer cover-boards made of metal, and species that prefer wetter microhabitats have been shown to prefer cover-boards made of wood.



Mist netting— Mist nets were used in 5 locations to capture bats. At each location 5 nets were erected near or over water at sunset. Netting occurred on a total of 13 nights in June and July of 2003. Nets were operated from 4 to 8 hours per night. Captured bats were removed from the nets immediately. These bats were identified to species, photographed, weighed, measured, and released

Road Cruising— Road cruising usually commenced at sunset or later and at time continued through the night. All cruising was done from an automobile. We recorded the start and end times, mileage driven, and route of the survey. All animals encountered were recorded. Road cruising occurred on 18 nights between 11 June and 6 August 2003; for a total of 33 hours and 50 minutes. All accessible roads in the recreation area were driven. During that time 1037 miles were driven. When new taxa were encountered, an attempt was made to capture the animal and photograph it as a voucher.

Inventory Results

Species encountered by Taxa— Overall there were 153 species of vertebrates encountered within the Chickasaw National Recreation Area (Appendix 1). Over half of these species were birds (n = 84), followed by reptiles (n = 37), mammals (n = 23) and amphibians (n = 9) in number of species detected (Figure 9).

Amphibians— Relatively few species of amphibians were encountered ($n=9$). All of these species were on the list of 16 species compiled prior to the inventory of species expected in Murray County. Not all of the 9 species detected were common. These species were first detected during incidental observations ($n=4$), road cruising ($n=3$), visual encounter surveys ($n=1$) or in drift fence samples ($n=1$). None of these species is considered a species of concern by the ONHI. Specifically, the ONHI ranks elements (in this case species) from 1 most threatened to 5 least threatened according to abundance, size of range, area of occupancy abundance trends, threats, and vulnerability. The ONHI tracks those elements with state ranks of S1, S2 or S3. More information on interpreting ranks is available at www.NatureServe.org.

Reptiles— Reptiles were second only to birds in the number of species encountered. The 37 species of reptiles were comprised of 18 species of snakes, 10 species of lizards (including skinks) and 9 species of turtles. The target list of reptiles that could occur in Murray County had 63 species. None of the reptiles encountered is tracked by the Oklahoma Natural Heritage Inventory (S1-S3). A particular effort was made to find horned lizards (*Phrynosoma cornutum*), but none was encountered. Most reptiles species were first encountered in incidental encounters ($n=23$), with others being first encounters during visual encounter surveys ($n=5$), turtle trapping ($n=3$), road cruising ($n=3$), and mammal trapping ($n=2$).

Mammals— A total of 23 species of mammals was detected. Most of these species were common within the CNRA. The most notable of these species was the marsh rice rat (*Oryzomys palustris*), which had not been recorded previously in Murray County, OK (Figure 10). This species was also the only mammal encountered that is tracked by the ONHI (S2). Southeastern Oklahoma is the western edge of its range and it is fairly uncommon in the state. Globally, however it is secure (rank of G5). Of the 25 species with known records in Murray County (Caire et al 1989), 16 were documented to occur in the recreation area. We also recorded an additional 6 species that were not attributed to Murray County by Caire et al. (1989). The absence of species from the initial list almost certainly reflects lack of complete collecting activity in Murray County rather than a historic absence of these species (e.g., raccoon, feral cat, bobcat). Of the 23 species 4 were first encountered while in mist nets (3 bats and southern flying squirrel), 13 were first encountered during live trapping sessions, and 6 were encountered during road cruising.

Birds— A total of 84 species of birds were detected in the CNRA. The Oklahoma date guide (Arterburn et al. 2000) lists 152 species that have been encountered in the southcentral region of Oklahoma between May and August. Many of these, however, breed in habitats that do not exist in the CNRA or are migrant waterbirds that make little use of Lake of the Arbuckles. Species tracked by the ONHI that were detected in the CNRA include, Black Vulture (S2), Canada Goose (S1), Cooper's Hawk (S2), Swainson's Hawk (S3), Spotted Sandpiper (S1), and Yellow Warbler (S3). Of these only the Black Vultures were relocated frequently. None of these species is of global concern (all are G4 or G5). The low state ranks primarily reflect Oklahoma's position at the fringe of the breeding range for these species. Most birds were first detected on point counts ($n=67$ species) with fewer being encountered incidentally ($n=19$), during visual encounter surveys ($n=3$) or during mist netting ($n=1$).

Species detected versus the target lists— Overall we detected 153 species and the pre inventory lists contained 247 species (Appendix 1). This 62% of species on the pre-inventory list does not reflect the completeness of the inventory, but rather the fact that the pre-inventory list were based on regional species lists. In fact there was often fair amount of disagreement between the pre-inventory list and our results.

For example it appears that we encountered very nearly the number of mammals that we expected to from a list of mammals that had been collected in Murray County based on Caire et al. (1989). However of the 23 species we encountered only 18 of those are on the pre-inventory list of 26 target species. Species not on the list included Armadillo, Raccoon, Southern Flying Squirrel and Bobcats; none of which are unexpected or rare in the region. They did not appear on the pre-inventory list because they had not been collected in Murray County prior to the publication of Caire et al. (1989).

While it is impossible to say with certainty what percent of species in the recreation area were detected, we re-evaluated species that were on the pre-inventory list but that we did not encounter. We tallied these species based on our opinion as to whether they would be detected with further sampling (Table 1, Appendix 1). Overall we expect that we encountered 82% (158 of 192) of the vertebrates that were likely to be in the recreation area between May and August. The majority of under-detection was concentrated on Snakes, Birds and Mammals. We suggest that and addition 13 species that were on the pre-inventory lists could be best detected in the recreation area by sampling in other seasons. Note that the pre-inventory bird list was confined to those species detected in the region between May and August. Additional bird species that are only present in migration and during winter would also be added. We also expect that 53 species on the list were either at the fringe of their ranges (18 species) or would find little suitable habitat within the recreation area (35 species). Finally, we suggest that if more sampling is to be done, it ought to focus on monitoring bat species, non-breeding birds, spring amphibian surveys, and targeted snake surveys. Auditory sampling of frogs and toads might be productive particularly for eastern species.

Species Accumulation by effort —The most efficient means of surveying were point counts for birds, incidental observations and visual encounter surveys (figures 11-14). Road Cruising was also relatively efficient. Mist-netting, and turtle trapping captured species that may not have been detected by other means, but produced relatively few species overall. Cover boards detected few species and these were readily detected by other means (mammal traps and visual encounters). Mammal trapping was fairly productive up to approximately 1000 trap nights where the number of new species reached a plateau.

Relative Abundance of Species by Sampling Method

Species accumulation curves through the summer of 2003 indicate that the total number of species that would be detected with significantly more effort during this time period is in the neighborhood 160. Of course more species of birds could be detected by employing a multi-season sampling scheme (Table 1). For example two winter counts done as part of the Oklahoma winter bird atlas project detected 26 bird species in the vicinity of the recreation area that that were not detected in the recreation area during summer. Most of these were winter residents. Of the species detected several might be good target species for monitoring.

Possible Management Target Species

We suggest developing management indicator species for two vegetation types within the recreation area. In bottomland and mature riparian zones, species such as Prothonotary Warbler, Louisiana Waterthrush, Northern Parula, and Marsh Rice Rat are all indicative of healthy wetlands or streams in central Oklahoma. In contrast uplands of central Oklahoma were historically characterized by grassland and grassland, savanna, and grassland-woodland ecotones. Restoring this character is a primary goal of fire management in the recreation area. Painted Buntings are found primarily in these grassland woodland transition zones. While this species is very common in the recreation area and throughout central Oklahoma, it has been highlighted by Partners-in-Flight as a species of concern. Dickcissels, Grasshopper Sparrows are also indicative of quality grassland and savannas of the crosstimbers ecoregion that have declined in abundance throughout their ranges. Consequently, they would make a good indicator species for the efficacy of fire management. Similarly, Northern Bobwhite uses these savanna habitats and also is an important species in the multiple use mission of the recreation area. Restoration of spotted skunk and Texas horned lizards to the area would also be progressive management targets.

Toward those ends, a feral cat control program would be a positive step for the recreation area. These meso-predators likely compete with foxes, bobcats, and skunks for prey. A substantial portion of these prey are native herptofauna, mammals, and birds. Also, because feral cats freely use the prominent urban interface of the recreation area they are likely to have enhanced effects on both native meso-predators and their prey. At a minimum research on the population biology and impacts of feral cats in the area are warranted.

References Cited

- Arterburn J.W. et al. 2000. Date guide to the occurrences of birds in Oklahoma. 3rd Edition. Oklahoma Ornithological Society.
- Black, J.H. and G. Sievert 1989. A field guide to Amphibians of Oklahoma. Oklahoma Department of Wildlife Conservation
- Caire, W., J.D. Tyler, B.P. Glass, and M.A. Mares. 1989. Mammals of Oklahoma. University of Oklahoma Press.
- Hoagland, B.W., F.L. Johnson, and S. Gray 2000. Vegetation study of Chickasaw National Recreation Area, Oklahoma. Unpublished report submitted to Chickasaw NRA.
- Seivert, G. and L. Seivert. 1993. A field guide to reptiles of Oklahoma. Oklahoma Department of Wildlife Conservation

Table 1. Number of species on the master lists, number encountered in the Chickasaw National Recreation Area, and number of species not detected (percent in parentheses) by reason that species were not encountered. Results are from the 2003 inventory.

Taxon	Target List	Species Detected	Species Not Listed	Reason Species Not Encountered ^a			
				Range	Habitat	Season	Sampling
Salamanders	2	0	0	0 (0)	0 (0)	2(100)	0 (0)
Frogs and Toads	18	9	0	4(22)	1 (6)	4 (22)	0 (0)
Turtles	13	8	0	3(23)	0 (0)	0 (0)	1 (8)
Lizards and Skinks	12	10	0	2(17)	0 (0)	0 (0)	0 (0)
Snakes	32	18	0	4(13)	0 (0)	0 (0)	10(31)
Birds	144	84	1	2 (1)	33(24)	7 (5)	18(13)
Mammals	26	23	5	3(12)	0 (0)	0 (0)	5(19)
Total	247	153	6	18	35	13	34

a Reasons species were not encountered reflect author's opinion as to whether further sampling would detect these species in the recreation area. Species that would likely be detected during the May through August period with more sampling are tallied under Sampling. Species that would likely be detected with sampling in a different season are listed under Season. Those not likely to be detected with further sampling are divided into those at the fringe of their ranges (Range), those within their range, but for whom there is little appropriate habitat in the recreation area (Habitat).

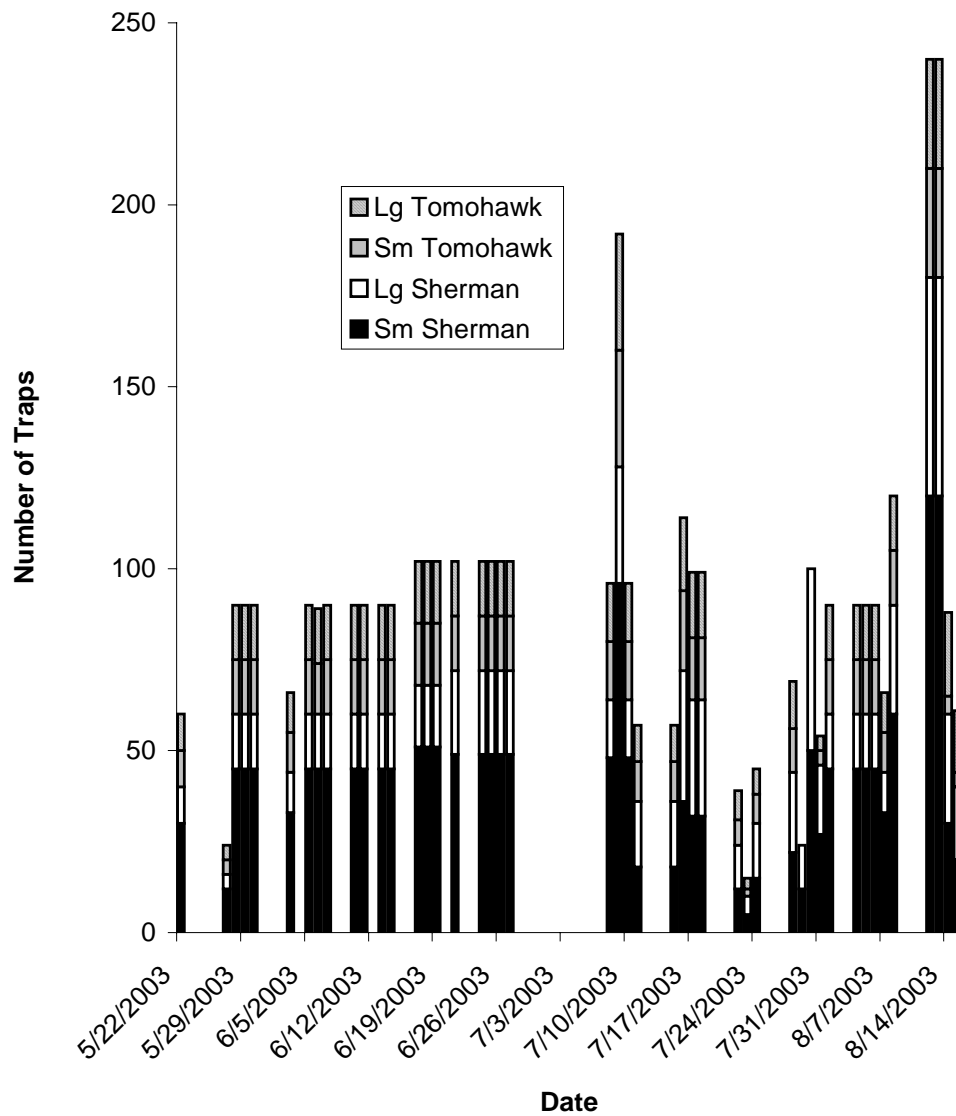


Figure 1. Number of mammal traps set per day in the summer of 2003. There were 4 different traps employed. These were large and small Sherman traps. And large and small tomohawk traps.

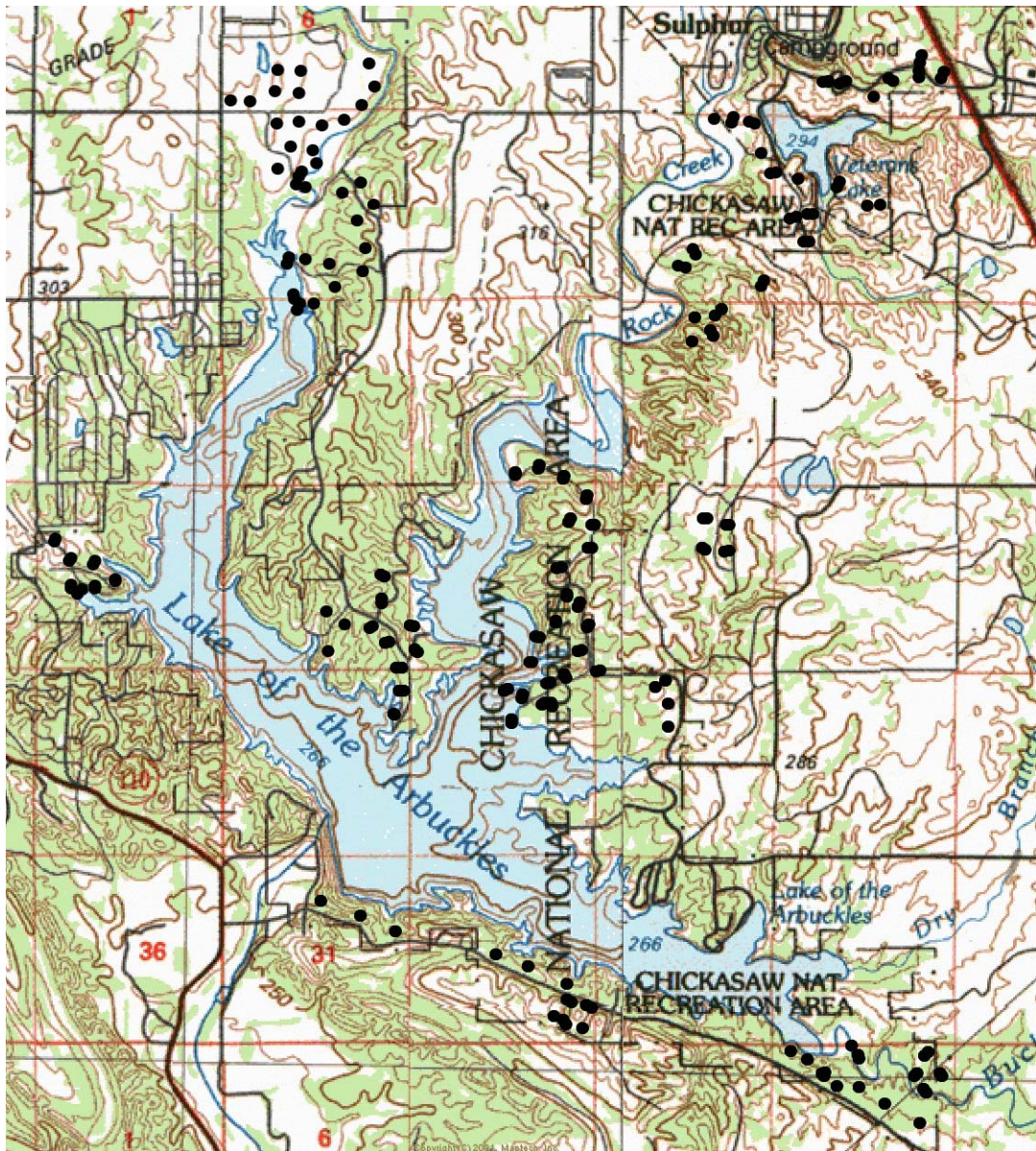


Figure 2. Mammal Trapping Stations

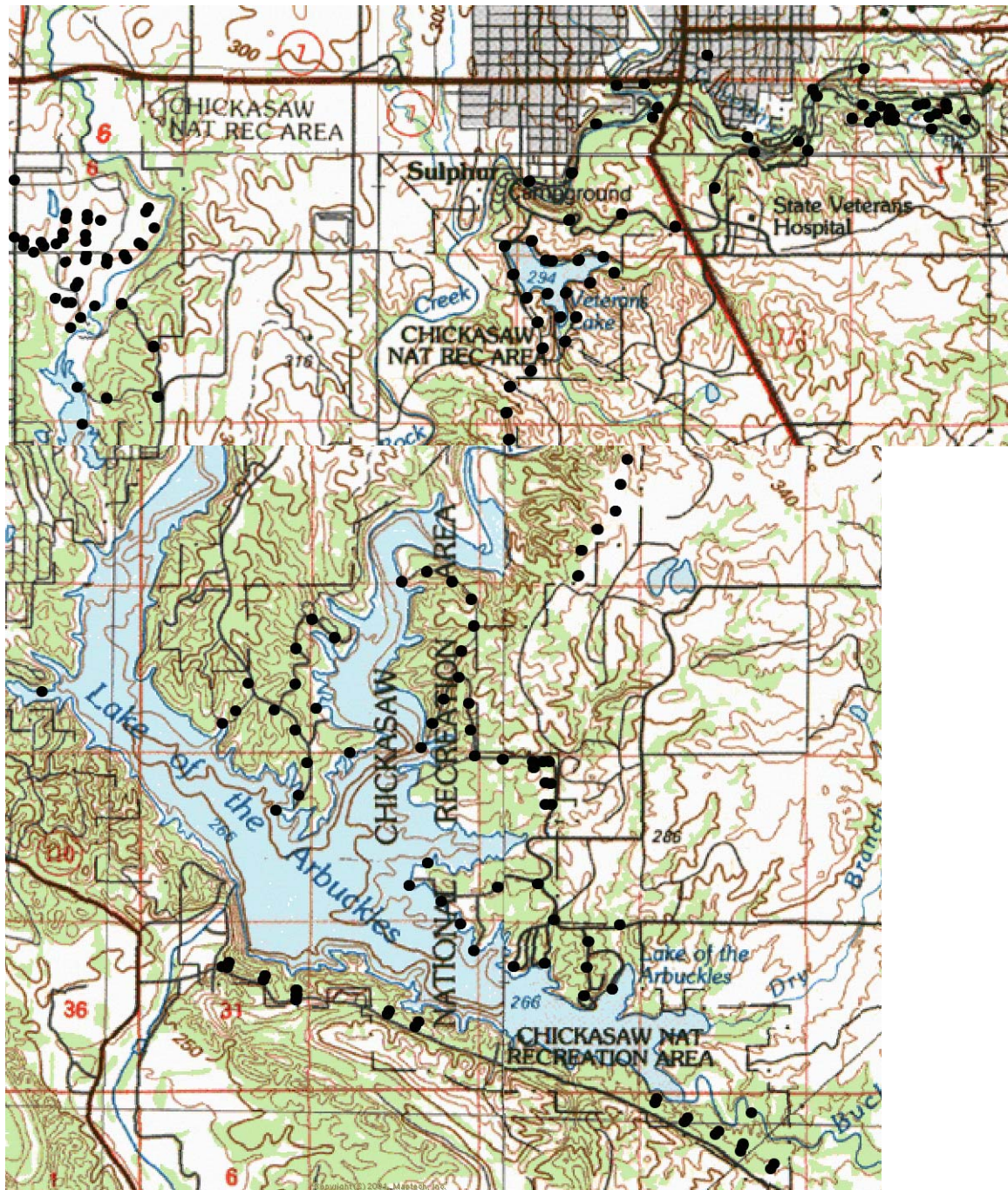


Figure 3. Locations of avian point counts



Figure 4. Locations of drift fences. There were 12 fence locations. However, only 11 are apparent because two were too close together to plot separately

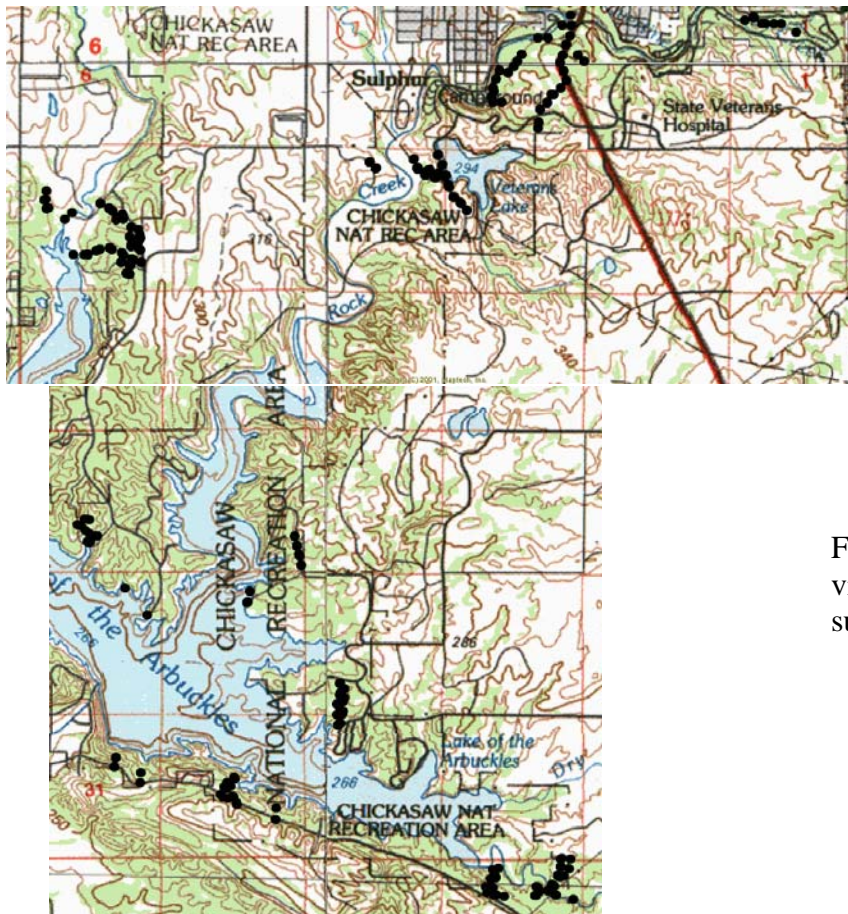


Figure 5. Locations of visual encounter surveys

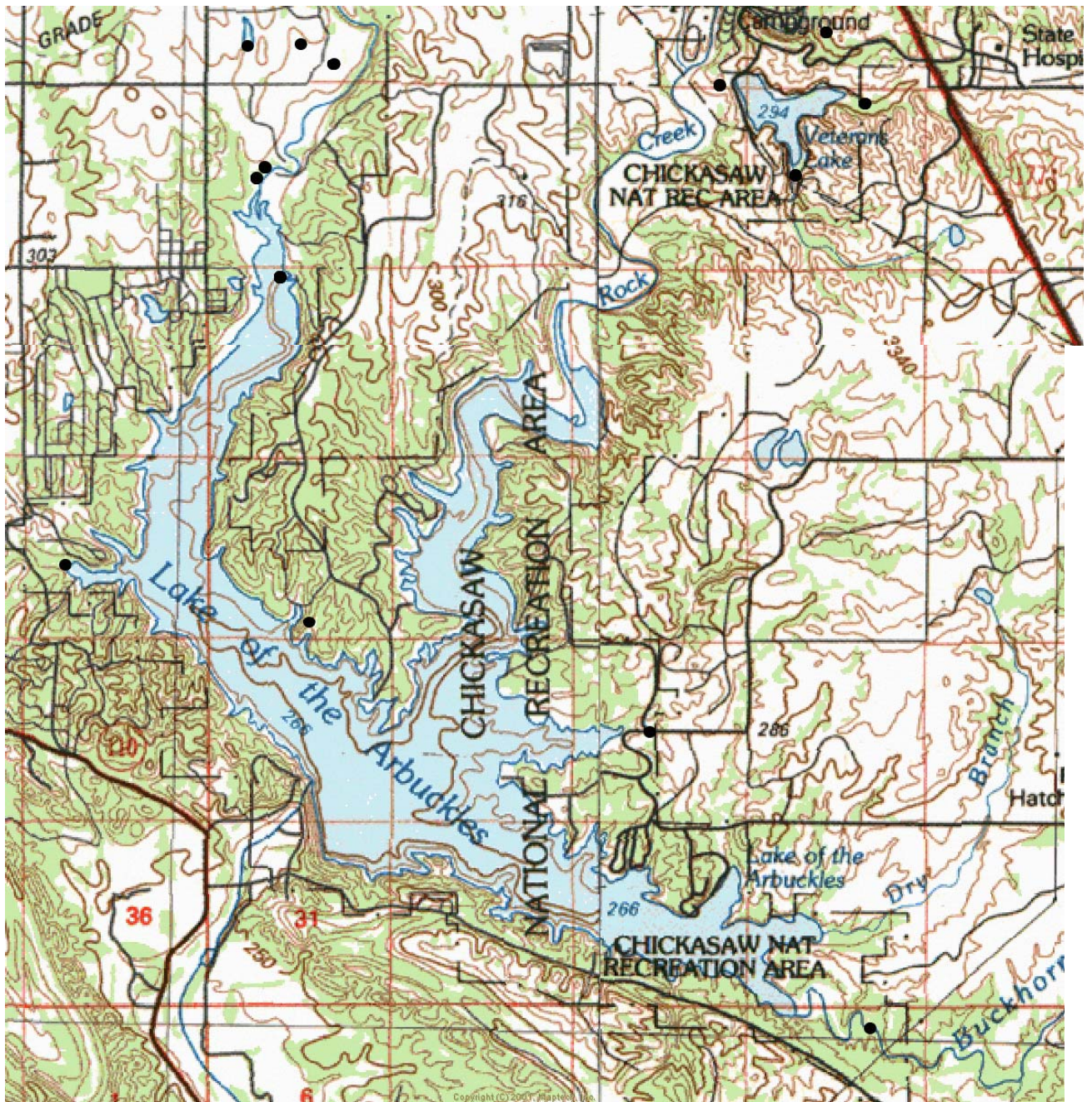


Figure 6. Locations of turtle traps

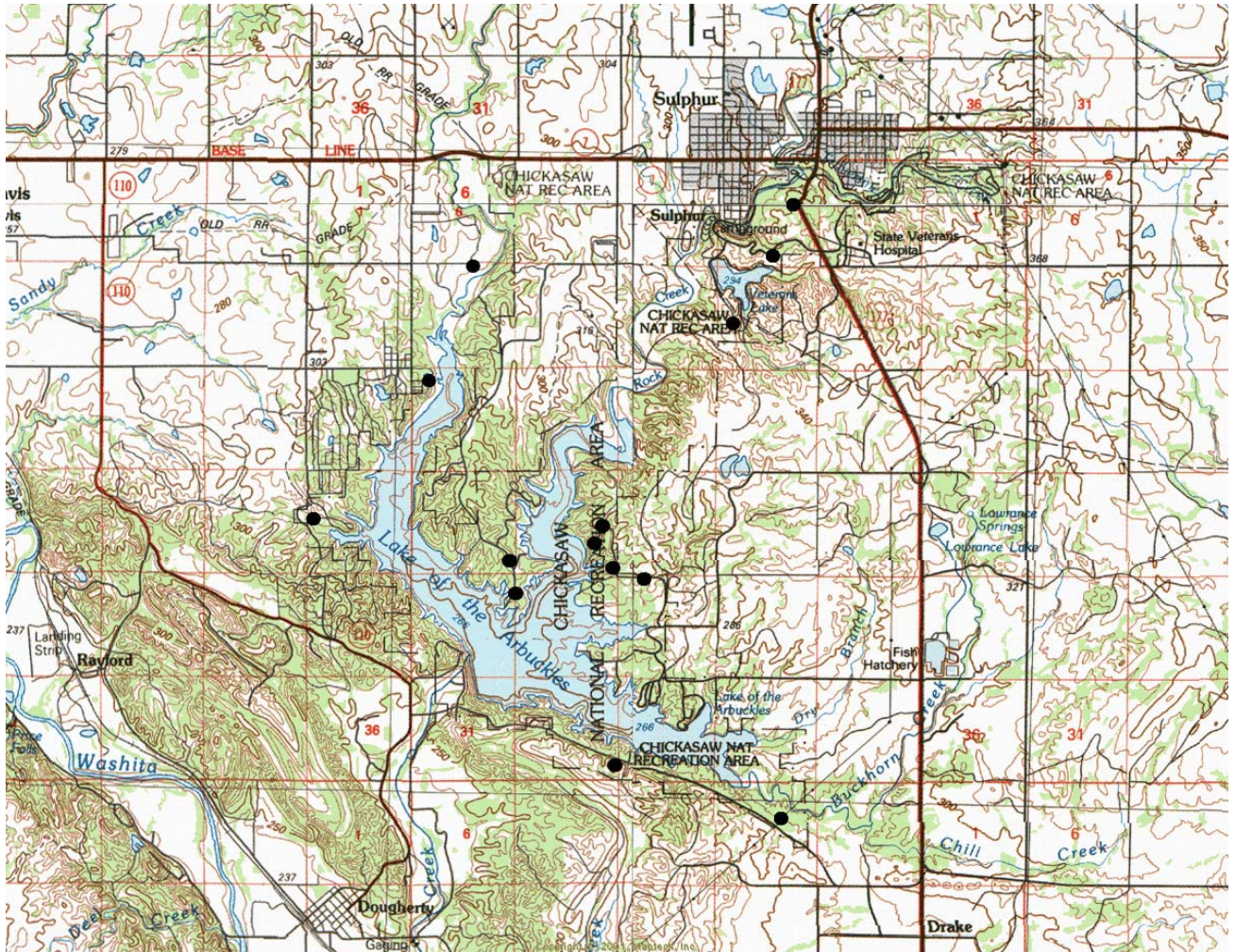


Figure 7. Locations of camera traps



Figure 8. Locations of cover boards

Species encountered During an Inventory of CNRA
May through August 2003

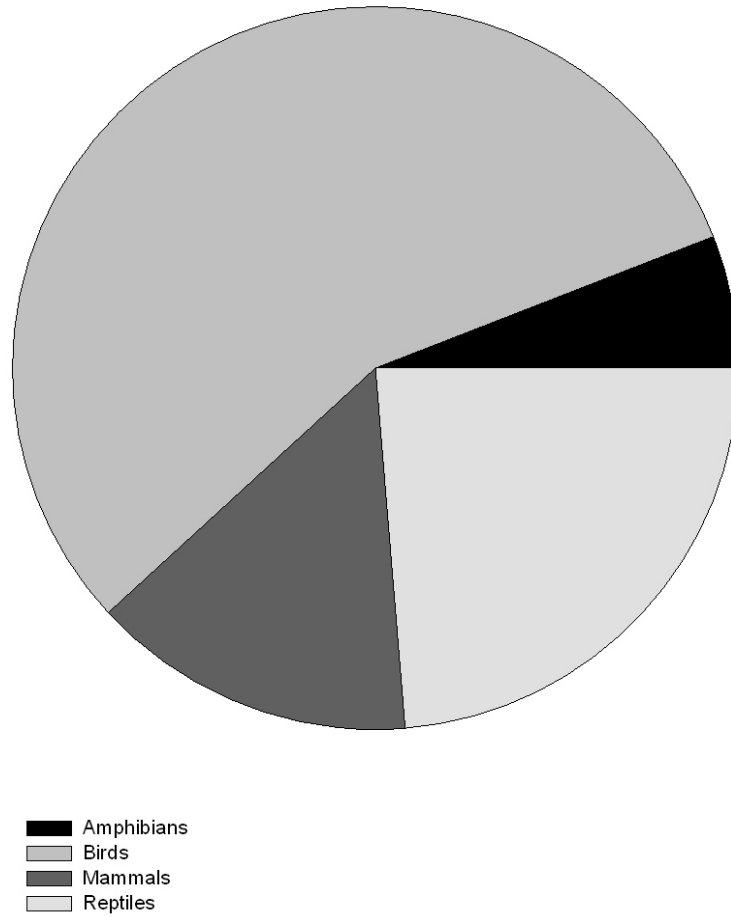


Figure 9. Relative proportions of taxa that comprised the 153 species detected in Chickasaw National Recreation Area.



Figure 10. Marsh Rice Rat (left) and the habitat in which it was captured in August 2003 at the Chickasaw National Recreation Area. Murray County Oklahoma.

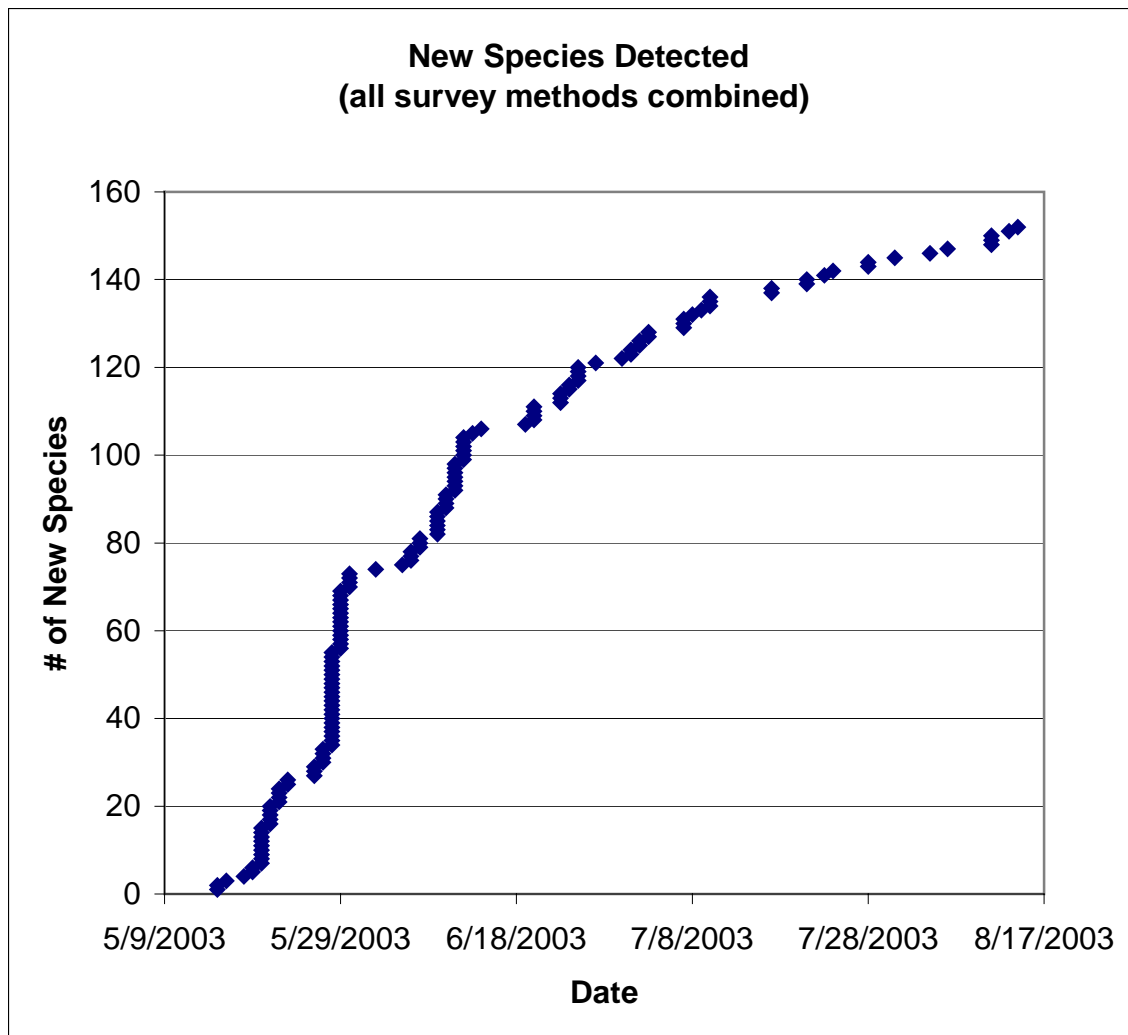


Figure 11. Cumulative number of tetrapod vertebrates species detected in the Chickasaw National Recreation Area by date.

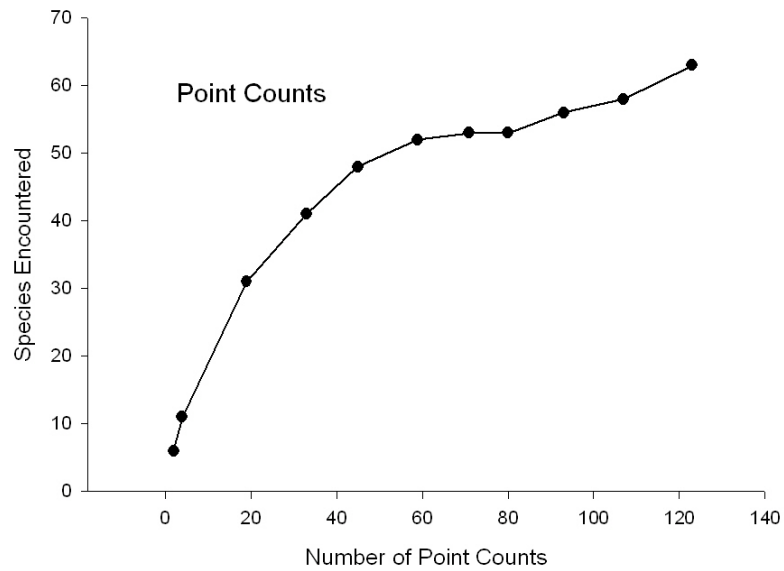
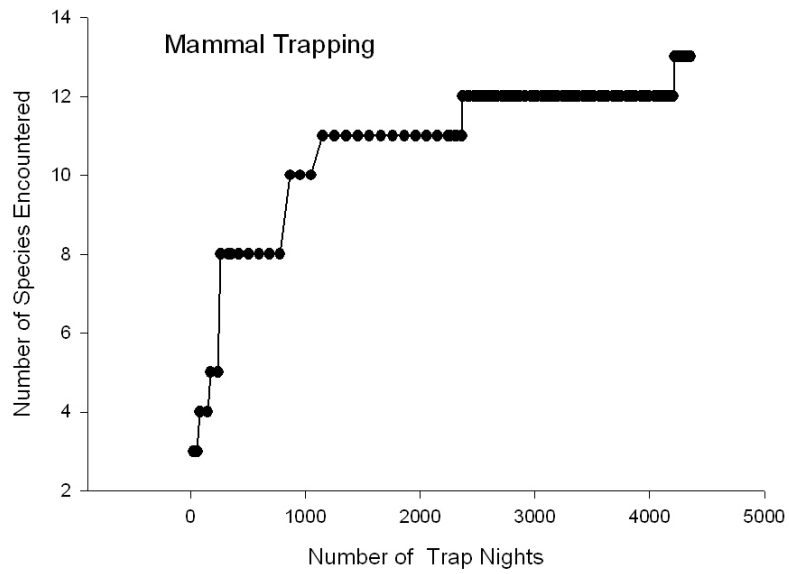


Figure 12. The number of mammal species encountered through trapping (top) and the number of bird species encountered during point counts (bottom),

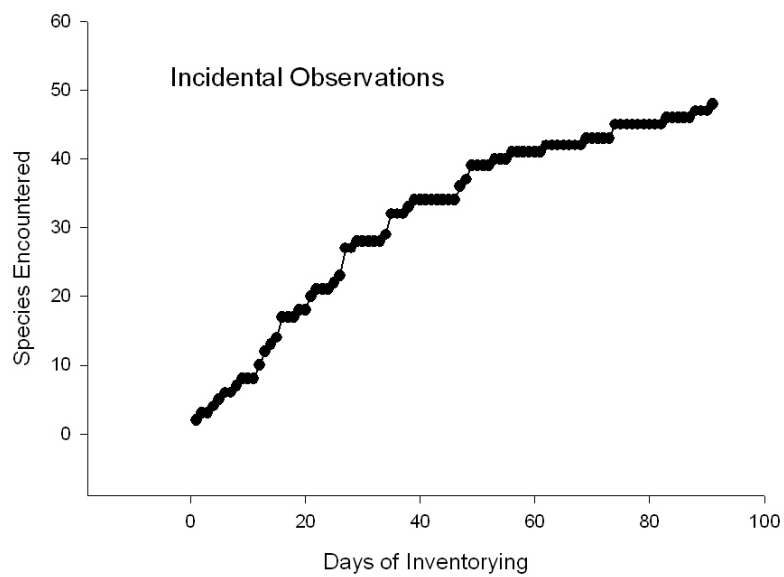
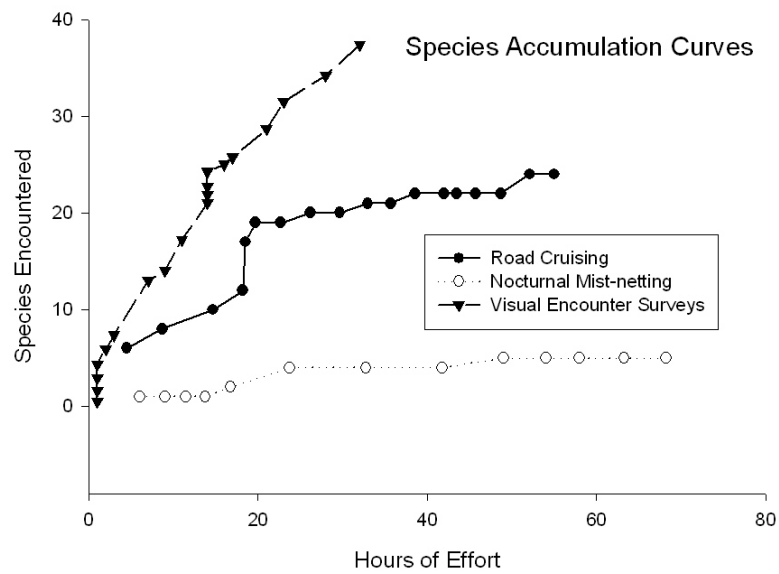


Figure 13. Number of species encountered with effort spent road cruising, nocturnal mist-netting, and conducting visual encounter surveys (top) and the number of species encountered incidentally between formal survey activities (bottom).

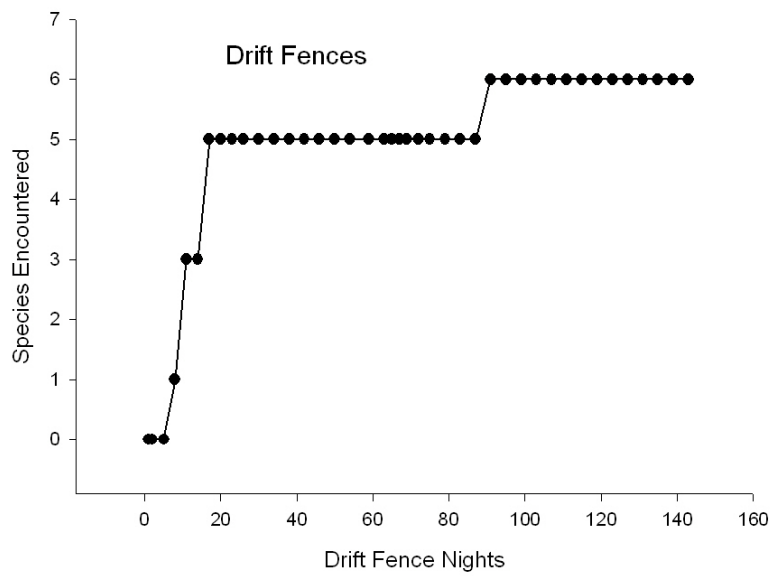
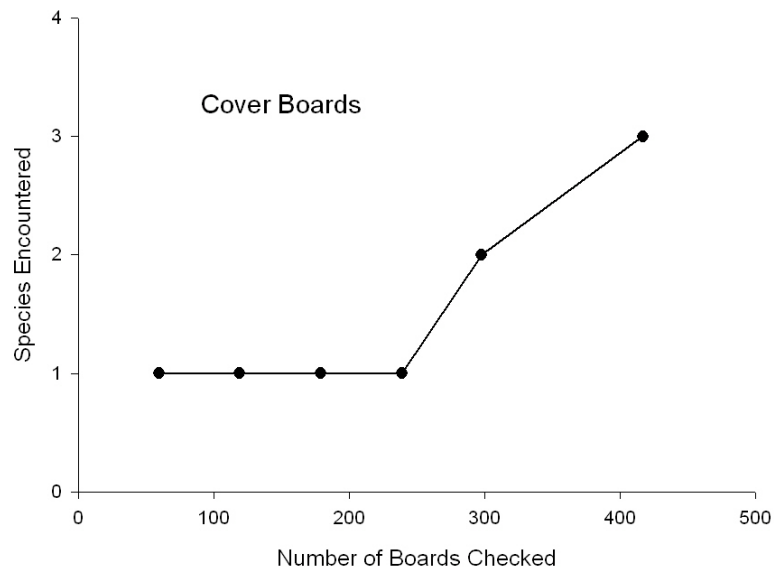


Figure 14. Number of species encountered when checking cover boards (top) and drift fences (bottom).

Appendix 1. Number of encounters by species and Survey method at Chickasaw National Recreation Area.

Common Name (<i>Scientific name</i>)	Code	On List? ^a	Detected? ^b	Reason Not Detected ^c
Salamanders				
Barred Tiger Salamander (<i>Ambystoma tigrinum</i>)	BTSA	Y	N	Season
Small-mouth Salamander (<i>Ambystoma texanum</i>)	SMSA	Y	N	Season
Frogs and Toads				
Woodhouse's toad (<i>Bufo woodhousii</i>)	BUWO	Y	Y	
American Toad (<i>Bufo Americanus</i>)	BUAM	Y	Y	
Green Toad (<i>Bufo debilis</i>)	BUDE	Y	N	Little Habitat
Red Spotted Toad (<i>Bufo punctatus</i>)	BUPU	Y	N	Fringe of Range
Plains Spadefoot (<i>Scaphiopus bombifrons</i>)	SCBO	Y	N	Season
Couch's Spadefoot (<i>Scaphiopus couchii</i>)	SCCO	Y	N	Season/Fringe of Range
Hurter's Spadefoot (<i>Scaphiopus Holbrookii</i>)	SCHO	Y	N	Season/little Habitat
Great Plains Narrowmouth Toad (<i>Gastrophryne olivacea</i>)	GAOL	Y	Y	
Gray treefrog complex (<i>Hyla Versicolor</i> and <i>H. chrysoscelis</i>).	HYVE	Y	Y	
Blanchard's cricket frog (<i>Acris crepitans blanchardi</i>)	ACCR	Y	Y	
Western Chorus Frog (<i>Psuedacris triseriata</i>)	PSTR	Y	N	Season
Spotted chorus frog (<i>Pseudacris clarkii</i>)	PSCL	Y	Y	
Strecker's Chorus Frog (<i>Psuedacris streckeri</i>)	PSST	Y	N	Season
Bullfrog (<i>Rana catesbeiana</i>)	RACA	Y	Y	
Crawfish Frog (<i>Rana areolata</i>)	RAAR	Y	N	Fringe of Range/ Little Habitat
Green Frog (<i>Rana clamitans</i>)	RACL	Y	N	Fringe of Range
Plains Leopard Frog (<i>Rana blairi</i>)	RABL	Y	Y	
Southern Leopard Frog (<i>Rana utricularia</i>)	RAUT	Y	Y	
Turtles				
Common Snapping turtle (<i>Chelydra serpentina</i>)	CHSE	Y	Y	
Alligator Snapping Turtle (<i>Macrolemys temminckii</i>)	MATE	Y	N	Fringe of Range
Common Musk Turtle (<i>Sternotherus odoratus</i>)	STOD	Y	N	Fringe of Range
Razorback Musk Turtle (<i>Sternotherus carinatus</i>)	STCA	Y	N	Fringe of Range

Appendix 1. Continued.

Common Name (<i>Scientific name</i>)	Code	On List?	Detected?	Reason Not Detected
Yellow Mud Turtle (<i>Kinosternon flavescens</i>)	KIFL	Y	Y	
Mississippi Mud Turtle (<i>Kinosternon subrubrum</i>)	KISU	Y	Y	
Ouachita Map Turtle (<i>Graptemys ouachitensis</i>)	GROU	Y	Y	
Red-eared Slider (<i>Trachemys scripta elegans</i>)	TRSC	Y	Y	
Missouri River Cooter (<i>Pseudemys concinna metteri</i>)	PSCO	Y	Y	
Three-toed box Turtle (<i>Terrapene carolina carolina</i>)	TECA	Y	Y	
Ornate Box Turtle (<i>Terrapene ornata ornata</i>)	TEOR	Y	Y	
Midland Smooth Softshell (<i>Apalone mutica</i>)	APMU	Y	N	Incomplete Sampling
Eastern Spiney softshell (<i>Apalone spinifera spinifera</i>)	APSP	Y	Y	
Lizards and Skinks				
Eastern Collared Lizard (<i>Crotaphytus collaris collaris</i>)	CRCO	Y	Y	
Fence Lizard (<i>Sceloporus undulatus</i>)	SCUN	Y	Y	
Texas Horned Lizard (<i>Phrynosoma cornutum</i>)	PHCO	Y	N	Extirpated
Texas Spotted Whiptail (<i>Aspidoscelis gularis gularis</i>)	CNGU	Y	Y	
Prairie Lined Racerunner (<i>Aspidoscelis sexlineatus sexlineatus</i>)	CNSE	Y	Y	
Ground Skink (<i>Scincella lateralis</i>)	SCLA	Y	Y	
Southern Coal Skink (<i>Eumeces anthracinus</i>)	EUAN	Y	N	Fringe of Range
Five-lined Skink (<i>Eumeces fasciatus</i>)	EUFA	Y	Y	
Great Plains Skink (<i>Eumeces obsoletus</i>)	EUOB	Y	Y	
Southern Prairie Skink (<i>Eumeces septentrionalis obtusirostris</i>)	EUSE	Y	Y	
Broadhead Skink (<i>Eumeces laticeps</i>)	EULA	Y	Y	
Western Slender Glass Lizard (<i>Ophisarius attenuatus</i>)	OPAT	Y	Y	
Snakes				
Blind Snake (<i>Leptotyphlops dulcis</i>)	LEDU	Y	Y	
Prairie Ringneck Snake (<i>Diadophis punctatus arnyi</i>)	DIPU	Y	Y	
Rough Earth Snake (<i>Virginia striatula</i>)	VIST	Y	Y	
Western Earth Snake (<i>Virginia valeriae</i>)	VIVA	Y	N	Fringe of Range
Flathead snake (<i>Tantilla gracilis</i>)	TAGR	Y	Y	

Appendix 1. Continued.

Common Name (<i>Scientific name</i>)	Code	On List?	Detected?	Reason Not Detected
Ground snake (<i>Sonora semiannulata</i>)	SOSE	Y	Y	
Rough green snake (<i>Opheodrys aestivus</i>)	OPAE	Y	Y	
Eastern yellowbellied racer (<i>Coluber constrictor flaviventris</i>)	COCO	Y	Y	
Coachwhip (<i>Masticophis flagellum</i>)	MAFL	Y	Y	
Blotched watersnake (<i>Nerodia erythrogaster transversa</i>)	NEER	Y	Y	
Northern Watersnake (<i>Nerodia sipedon</i>)	NESI	Y	N	Fringe of Range
Diamond-backed Watersnake (<i>Nerodia rhombifer</i>)	NERH	Y	N	Incomplete Sampling
Western Hognose Snake (<i>Heterodon nasicus</i>)	HENA	Y	N	Incomplete Sampling
Eastern Hognose Snake (<i>Heterodon platirhinos</i>)	HEPL	Y	N	Incomplete Sampling
Great Plains Rat snake (<i>Elaphe guttata emoryi</i>)	ELGU	Y	Y	
Black Rat Snake (<i>Elaphe obsoleta obsoleta</i>)	ELOB	Y	Y	
Texas Night Snake (<i>Hypsiglena torquata</i>)	HYTO	Y	N	Fringe of Range
Bullsnake (<i>Pituophis melanoleucus</i>)	PIME	Y	N	Incomplete Sampling
Prairie Kingsnake (<i>Lampropeltis calligaster calligaster</i>)	LACA	Y	Y	
Speckled Kingsnake (<i>Lampropeltis getula</i>)	LAGE	Y	N	Incomplete Sampling
Milk Snake (<i>Lampropeltis triangulum</i>)	LATA	Y	N	Incomplete Sampling
Graham's Crayfish Snake (<i>Regina grahamii</i>)	REGR	Y	N	Incomplete Sampling
Northern Scarlet Snake (<i>Cemophora coccinea</i>)	CECO	Y	N	Fringe of Range
Brown Snake (<i>Storeria dekayi</i>)	STDE	Y	Y	
Lined Snake (<i>Tropidoclonion lineatum</i>)	TRLI	Y	N	Incomplete Sampling
Western Ribbon snake (<i>Thamnophis proximus proximus</i>)	THPR	Y	Y	
Common Garter Snake (<i>Thamnophis sirtalis</i>)	THIS	Y	N	Incomplete Sampling
Western Cottonmouth (<i>Agkistrodon piscivorous leucostoma</i>)	AGPI	Y	Y	
Copperhead (<i>Agkistrodon contortix</i>)	AGCO	Y	Y	
Western Pygmy Rattlesnake (<i>Sistrurus miliarius</i>)	SIMI	Y	N	Incomplete Sampling
Timber rattlesnake (<i>Crotalus horridus</i>)	CRHO	Y	Y	
Western Diamondback rattlesnake (<i>Crotalus atrox</i>)	CRAT	Y	Y	

Birds

Pied-billed Grebe (<i>Podilymbus podiceps</i>)	PBGR	Y	Y	
American White Pelican (<i>Pelecanus erythrorhynchos</i>)	AMWP	Y	N	Season

Appendix 1. Continued.

Common Name (<i>Scientific name</i>)	Code	On List?	Detected?	Reason Not Detected
Neotropic Cormorant (<i>Phalacrocorax brasilianus</i>)	NECO	Y	N	Little Habitat
Double-crested Cormorant (<i>Phalacrocorax auritus</i>)	DCCO	Y	N	Incomplete Sampling
Great Blue Heron (<i>Ardea herodias</i>)	GBHE	Y	Y	
Least Bittern (<i>Ixobrychus exilis</i>)	LEBI	Y	N	Little Habitat
Great Egret (<i>Ardea alba</i>)	GREG	Y	Y	
Snowy Egret (<i>Egretta thula</i>)	SNEG	Y	N	Incomplete Sampling
Little Blue Heron (<i>Egretta caerulea</i>)	LBHE	Y	Y	
Cattle Egret (<i>Bubulcus ibis</i>)	CAEG	Y	Y	
Green Heron (<i>Butorides virescens</i>)	GRHE	Y	Y	
Yellow-crowned Night Heron (<i>Nycticorax nycticorax</i>)	YCNH	Y	Y	
Black-crowned Night Heron (<i>Nycticorax nycticorax</i>)	BCNH	Y	N	Incomplete Sampling
White Ibis (<i>Eudocimus albus</i>)	WHIB	Y	N	Little Habitat
White-faced Ibis (<i>Plegadis chihi</i>)	WFIB	Y	N	Little Habitat
Black Vulture (<i>Coragyps atratus</i>)	BLVU	Y	Y	
Turkey Vulture (<i>Cathartes aura</i>)	TUVU	Y	Y	
Wood Stork (<i>Mycteria americana</i>)	WOST	Y	N	Fringe of Range
Canada Goose (<i>Branta canadensis</i>)	CAGO	Y	Y	
Wood Duck (<i>Aix sponsa</i>)	WODU	Y	Y	
Mallard (<i>Anas platyrhynchos</i>)	MALL	Y	N	Fringe of Range
Mississippi Kite (<i>Ictinia mississippiensis</i>)	MIKI	Y	Y	
Cooper's Hawk (<i>Accipiter cooperii</i>)	COHA	Y	Y	
Red-shouldered Hawk (<i>Buteo lineatus</i>)	RSHA	Y	Y	
Broad-winged Hawk (<i>Buteo platypterus</i>)	BWHA	Y	N	Incomplete Sampling
Swainson's Hawk (<i>Buteo Swansonii</i>)	SWHA	Y	Y	
Red-tailed Hawk (<i>Buteo jamaicensis</i>)	RTHA	Y	N	Incomplete Sampling
American Kestrel (<i>Falco sparverius</i>)	AMKE	Y	N	Incomplete Sampling
Wild Turkey (<i>Meleagris gallopavo</i>)	WITU	Y	Y	
Northern Bobwhite (<i>Colinus virginianus</i>)	NOBW	Y	Y	
King Rail (<i>Rallus elegans</i>)	KIRA	Y	N	Little Habitat/Fringe of Range
Common Moorhen (<i>Gallinula chloropus</i>)	COMO	Y	N	Incomplete Sampling
American Coot (<i>Fulica americana</i>)	AMCO	Y	N	Incomplete Sampling/Season
Killdeer (<i>Charadrius vociferous</i>)	KILL	Y	Y	

Appendix 1. Continued.

Common Name (<i>Scientific name</i>)	Code	On List?	Detected?	Reason Not Detected
Greater Yellowlegs (<i>Tringa melanoleuca</i>)	GRYE	Y	N	Little Habitat/Season
Lesser Yellowlegs (<i>Tringa flavipes</i>)	LEYE	Y	N	Little Habitat/Season
Willet (<i>Catoptrophorus semipalmatus</i>)	WILL	Y	N	Little Habitat/Season
Solitary Sandpiper (<i>Tringa solitaria</i>)	SOSA	Y	N	Little Habitat/Season
Spotted Sandpiper (<i>Actitis macularia</i>)	SPSA	Y	Y	
Upland Sandpiper (<i>Bartramia longicauda</i>)	UPSA	Y	N	Little Habitat/Season
Marbled Godwit (<i>Limosa fedoa</i>)	MAGO	Y	N	Little Habitat/Season
Sanderling (<i>Calidris alba</i>)	SAND	Y	N	Little Habitat/Season
Semipalmated Sandpiper (<i>Calidris pusilla</i>)	SESA	Y	N	Little Habitat/Season
Western Sandpiper (<i>Calidris mauri</i>)	WESA	Y	N	Little Habitat/Season
Least Sandpiper (<i>Calidris minutilla</i>)	LESA	Y	Y	
White-rumped Sandpiper (<i>Calidris fuscicollis</i>)	WRSA	Y	N	Little Habitat/Season
Baird's Sandpiper (<i>Calidris bairdii</i>)	BASA	Y	N	Little Habitat/Season
Pectoral Sandpiper (<i>Calidris melanotos</i>)	PESA	Y	N	Little Habitat/Season
Stilt Sandpiper (<i>Calidris himantopus</i>)	STSA	Y	N	Little Habitat/Season
Short-billed Dowitcher (<i>Limnodromus griseus</i>)	SBDO	Y	N	Little Habitat/Season
Long-billed Dowitcher (<i>Limnodromus scolopaceus</i>)	LBDO	Y	N	Little Habitat/Season
Wilson's Phalarope (<i>Phalaropus tricolor</i>)	WIPH	Y	N	Little Habitat/Season
Laughing Gull (<i>Larus atricilla</i>)	LAGU	Y	N	Little Habitat
Franklin's Gull (<i>Larus pipixcan</i>)	FRGU	Y	N	Little Habitat/Season
Ring-billed Gull (<i>Larus delawarensis</i>)	RBGU	Y	N	Little Habitat/Season
Caspian Tern (<i>Sterna caspia</i>)	CATE	Y	N	Little Habitat/Season
Forster's Tern (<i>Sterna forsteri</i>)	FOTE	Y	N	Little Habitat/Season
Least Tern (<i>Sterna antillarum</i>)	LETE	Y	N	Little Habitat
Black Tern (<i>Chidonias niger</i>)	BLTE	Y	N	Little Habitat/Season
Mourning Dove (<i>Zenaida macroura</i>)	MODO	Y	Y	
Rock Dove (<i>Columba livia</i>)	RODO	Y	Y	
Black-billed Cuckoo (<i>Coccyzus erythrophthalmus</i>)	BBCU	Y	N	Fringe of Range
Yellow-billed Cuckoo (<i>Coccyzus americanus</i>)	YBCU	Y	Y	
Greater Roadrunner (<i>Geococcyx californianus</i>)	GRRO	Y	Y	
Barn Owl (<i>Tyto alba</i>)	BANO	Y	N	Little Habitat
Eastern Screech Owl (<i>Otus Asio</i>)	ESOW	Y	Y	

Appendix 1. Continued.

Common Name (<i>Scientific name</i>)	Code	On List?	Detected?	Reason Not Detected
Great Horned Owl (<i>bubo virginianus</i>)	GHOW	Y	Y	
Barred Owl (<i>Strix varia</i>)	BADO	Y	Y	
Common Nighthawk (<i>Chordeiles minor</i>)	CONI	Y	Y	
Chuck-will's-widow (<i>Caprimulgus carolinensis</i>)	CWWI	Y	Y	
Chimney Swift (<i>Chaetura pelagica</i>)	CHSW	Y	Y	
Ruby-throated Hummingbird (<i>Archilochus colubris</i>)	RTHU	Y	Y	
Belted Kingfisher (<i>Ceryle alcyon</i>)	BEKI	Y	Y	
Red-headed Woodpecker (<i>Melanerpes erythrocephalus</i>)	RHWO	Y	Y	
Red-bellied Woodpecker (<i>Melanerpes carolinus</i>)	RBWO	Y	Y	
Downy Woodpecker (<i>Picoides pubescens</i>)	DOWO	Y	Y	
Hairy Woodpecker (<i>Picoides villosus</i>)	HAWO	Y	Y	
Northern Flicker (<i>Colaptes auratus</i>)	NOFL	Y	Y	
Pileated Woodpecker (<i>Dryocopus pileatus</i>)	PIWO	Y	Y	
Eastern Wood-peewee (<i>Contopus virens</i>)	EAWP	Y	Y	
Eastern Phoebe (<i>Sayornis phoebe</i>)	EAPH	Y	Y	
Western Kingbird (<i>Tyrannus verticalis</i>)	WEKI	Y	Y	Incomplete Sampling
Eastern Kingbird (<i>Tyrannus tyrannus</i>)	EAKI	Y	N	Incomplete Sampling
Great-crested Flycatcher (<i>Myiarchus crinitus</i>)	GCFL	Y	Y	
Scissor-tailed Flycatcher (<i>Tyrannus forficatus</i>)	STFL	Y	Y	
Loggerhead Shrike (<i>Lanius ludovicianus</i>)	LOSH	Y	N	Little Habitat/ Fringe of Range
White-eyed Vireo (<i>Vireo griseus</i>)	WEVI	Y	Y	
Bell's Vireo (<i>Vireo bellii</i>)	BEVI	Y	N	Incomplete Sampling
Warbling vireo (<i>Vireo gilvus</i>)	WAVI	Y	N	Incomplete Sampling
Red-eyed Vireo (<i>Vireo olivaceus</i>)	REVI	Y	Y	
Blue Jay (<i>Cyanocitta cristata</i>)	BLJA	Y	Y	
American Crow (<i>Corvus brachyrhynchos</i>)	AMCR	Y	Y	
Horned Lark (<i>Eremophila alpestris</i>)	HOLA	Y	N	Little Habitat
Purple Martin (<i>Progne subis</i>)	PUMA	Y	Y	
Northern Rough-winged Swallow (<i>Stelgidopteryx serripennis</i>)	NRWS	Y	Y	
Bank Swallow (<i>Riparia riparia</i>)	BANS	Y	N	Fringe of Range
Cliff Swallow (<i>Petrochelidon pyrrhonota</i>)	CLSW	Y	Y	
Barn Swallow (<i>Hirundo rustica</i>)	BARS	Y	Y	

Appendix 1. Continued.

Common Name (<i>Scientific name</i>)	Code	On List?	Detected?	Reason Not Detected
Carolina Chickadee (<i>Poecile carolinensis</i>)	CACH	Y	Y	
Tufted titmouse (<i>Baeolophus bicolor</i>)	TUTI	Y	Y	
White-breasted nuthatch (<i>Sitta carolinensis</i>)	WBNU	Y	Y	
Carolina Wren (<i>Thryothorus ludovicianus</i>)	CARW	Y	Y	
Bewick's Wren (<i>Thryomanes bewickii</i>)	BEWR	Y	Y	
Blue-gray Gnatcatcher (<i>Poliophtila nigriceps</i>)	BGGN	Y	Y	
Swainson's Thrush (<i>Catharus ustulatus</i>)	SWTH	N	Y	
Wood Thrush (<i>Hylocichla mustelina</i>)	WOTH	Y	N	Fringe of Range
American Robin (<i>Turdus migratorius</i>)	AMRO	Y	Y	
Eastern Bluebird (<i>Sialia sialis</i>)	EABL	Y	Y	
Gray Catbird (<i>Dumetella carolinensis</i>)	GRCA	Y	Y	
Northern Mockingbird (<i>Mimus polyglottus</i>)	NOMO	Y	Y	
Brown Thrasher (<i>Toxostoma rufum</i>)	BRTH	Y	Y	
European Starling (<i>Sturnus vulgaris</i>)	EUST	Y	Y	
Northern Parula (<i>Parula americana</i>)	NOPA	Y	Y	
Yellow Warbler (<i>Dendroica petechia</i>)	YWAR	Y	Y	
Black-and-white Warbler (<i>Mniotilta varia</i>)	BAWW	Y	Y	
Prothonotary Warbler (<i>Protonotaria citrea</i>)	PROW	Y	Y	
Louisiana Waterthrush (<i>Seiurus motacilla</i>)	LOWA	Y	Y	
Yellow-throated Warbler (<i>Dendroica dominica</i>)	YTWA	Y	Y	
Kentucky Warbler (<i>Oporornis formosus</i>)	KEWA	Y	N	Fringe of Range
Common Yellowthroat (<i>Geothlypis trichas</i>)	COYE	Y	N	Incomplete Sampling
Yellow-breasted Chat (<i>Icteria virens</i>)	YBCH	Y	N	Incomplete Sampling
Summer Tanager (<i>Piranga rubra</i>)	SUTA	Y	Y	
Cassin's Sparrow (<i>Aimophila cassinii</i>)	CASP	Y	N	Little Habitat/Fringe of Range
Rufous-crowned Sparrow (<i>Aimophila ruficeps</i>)	RCSP	Y	N	Little Habitat/Fringe of Range
Chipping Sparrow (<i>Spizella passerina</i>)	CHSP	Y	N	Little Habitat
Field Sparrow (<i>Spizella pusilla</i>)	FISP	Y	Y	
Lark Sparrow (<i>Chondestes grammacus</i>)	LASP	Y	Y	
Grasshopper Sparrow (<i>Ammodramus savannarum</i>)	GRSP	Y	N	Incomplete Sampling
Northern Cardinal (<i>Cardinalis Cardinalis</i>)	NOCA	Y	Y	
Blue Grosbeak (<i>Guiraca caerulea</i>)	BLGR	Y	N	Incomplete Sampling

Appendix 1. Continued.

Common Name (<i>Scientific name</i>)	Code	On List?	Detected?	Reason Not Detected
Indigo Bunting (<i>Passerina cyanea</i>)	INBU	Y	Y	
Painted Bunting (<i>Passerina ciris</i>)	PABU	Y	Y	
Dickcissel (<i>Spiza Americana</i>)	DICK	Y	Y	
Red-winged Blackbird (<i>Agelaius phoeniceus</i>)	RWBL	Y	Y	
Yellow-headed Blackbird (<i>Xanthocephalus xanthocephalus</i>)	YHBL	Y	N	Fringe of Range
Brown-headed Cowbird (<i>Molothrus ater</i>)	BHCO	Y	Y	
Eastern Meadowlark (<i>Sturnella magna</i>)	EAME	Y	Y	
Common Grackle (<i>Quiscalus quiscula</i>)	COGR	Y	Y	
Great-tailed Grackle (<i>Quiscalus major</i>)	GTGR	Y	Y	
Orchard Oriole (<i>Icterus spurius</i>)	OROR	Y	N	Incomplete Sampling
Baltimore Oriole (<i>Icterus glabula</i>)	BAOR	Y	N	Incomplete Sampling
American Goldfinch (<i>Carduelis tristis</i>)	AMGO	Y	Y	
House Finch (<i>Carpodacus mexicanus</i>)	HOFI	Y	N	Incomplete Sampling
House Sparrow (<i>Passer domesticus</i>)	HOSP	Y	Y	
Mammals				
Virginia Opossum (<i>Didelphis virginianus</i>)	DIVI	Y	Y	
Eliot's Short-tailed Shrew (<i>Blarina hylophaga</i>)	BLHY	Y	N	Incomplete Sampling
Eastern Mole (<i>Scalopus aquaticus</i>)	SCAQ	Y	N	Incomplete Sampling
Eastern pipistrel (<i>Pipistrellus subflavus</i>)	PISU	Y	Y	
Red Bat (<i>Lasiurus borealis</i>)	LABO	Y	Y	
Evening Bat (<i>Nycticeus humeralis</i>)	NYHU	Y	Y	
Seminole Bat (<i>Lasiurus seminolus</i>)	LASE	Y	N	Fringe of Range
Brazilian Free-tailed Bat (<i>Tadarida brasiliensis</i>)	TABR	Y	N	Incomplete Sampling
Armadillo (<i>Dasypus novemcinctus</i>)	DANO	N	Y	
Eastern Cottontail (<i>Sylvilagus floridanus</i>)	SYFL	Y	Y	
Swamp Rabbit (<i>Sylvilagus aquaticus</i>)	SYAQ	Y	N	Fringe of Range
Raccoon (<i>Procyon Lotor</i>)	PRLO	N	Y	
Striped Skunk (<i>Mephitis mephitis</i>)	MEME	Y	Y	
Gray Squirrel (<i>Sciurus carolinensis</i>)	SCCA	Y	N	Fringe of Range
Fox Squirrel (<i>Sciurus niger</i>)	SCNI	Y	Y	

Appendix 1. Continued.

Common Name (<i>Scientific name</i>)	Code	On List?	Detected?	Reason Not Detected
Southern Flying Squirrel (<i>Glaucomys volens</i>)	GLVO	N	Y	
Plains Pocket Gopher (<i>Geomys bursarius</i>)	GEBU	Y	N	Incomplete Sampling
Beaver (<i>Castor Canadensis</i>)	CACA	Y	Y	
Fulvous Harvest Mouse (<i>Reithrodontomys fulvescens</i>)	REFU	Y	Y	
Texas Mouse (<i>Peromyscus attwateri</i>)	PETA	Y	Y	
White-footed mouse (<i>Peromyscus leucopus</i>)	PELE	Y	Y	
Deer mouse (<i>Peromyscus maniculatus</i>)	PEMA	Y	Y	
Rice Rat (<i>Oryzomys palustris</i>)	ORPA	N	Y	
Hispid Cotton rat (<i>Sigmodon hispidus</i>)	SIHI	Y	Y	
Eastern woodrat (<i>Neotoma floridana</i>)	NEFL	Y	Y	
Woodland Vole (<i>Pitymys pinetorum</i>)	PIPI	Y	N	Incomplete Sampling
Coyote (<i>Canis latrans</i>)	CALA	Y	Y	
Gray Fox (<i>Urocyon cinereoargenteus</i>)	URCI	Y	Y	
White-tailed deer (<i>Odocoiles virginianus</i>)	ODVI	Y	Y	
Bobcat (<i>Lynx rufus</i>)	LYRU	N	Y	
Domestic cat (<i>Felis catus</i>)	FECA	Y	Y	

a was the species on the pre-inventory target list

b was the species detected during the inventory

c what is our best guess as to the reason why the species was not detected. Fringe of range implies the species does not occur in the recreation area, Little Habitat implies that the recreation area was within the species' range but there was no local population, Incomplete Sampling implies that we suspect that the species occurs in the recreation area and could be detected with more and focused sampling.

Appendix 2 - Voucher Photos –Chickasaw National Recreation Area

Amphibians


Woodhouse's Toad
(*Bufo Woodhousii*)



American Toad
(*Bufo Americanus*)



Gray treefrog
(*Hyla Versicolor*)

Turtles


Common Snapping turtle
(*Chelydra serpentina*)



Yellow Mud turtle
(*Kinosternon flavescens*)



Red-eared Slider
(*Trachemys scripta*)



Ornate box turtle
(*Terrapene ornata ornata*)



Eastern Spiny softshell
(*Apalone spinifera spinifera*)



Missouri River Cooter
(*Psuedemys concinna*)

Lizards and Skinks


Eastern Collared Lizard
(*Crotaphytus collaris*)



Fence Lizard
(*Sceloporus undulatus*)



Texas spotted whiptail
(*Aspidoscelis gularis gularis*)



Prairie lined racerunner
(*Aspidoscelis sexlineatus*)



Ground skink
(*Scincella lateralis*)



Great plains skink
(*Eumeces obsoletus*)

Snakes


Blind Snake
(*Leptotyphlops dulcis*)



Prairie ringneck snake (*Diadophis punctatus arnyi*)



Flathead snake
(*Tantilla gracilis*)



Ground snake
(*Sonora semiannulata*)



Rough green snake
(*Opheodrys aestivus*)



Eastern yellowbellied racer
(*Coluber constrictor*)



Coachwhip
(*Masticophis flagellum*)



Blotched watersnake
(*Nerodia erythrogaster*)



Timber rattlesnake
(*Crotalus horridus*)



Brown snake
(*Storeria dekayi*)



Western Ribbon snake
(*Thamnophis proximus*)



Copperhead
(*Agkistrodon contortix*)

Mammals


Virginia Opossum
(*Didelphis virginianus*)



Eastern pipistrel
(*Pipistrellus subflavus*)



Red Bat
(*Lasiurus borealis*)



Evening Bat
(*Nycticeus humeralis*)



Eastern Cottontail
(*Sylvilagus floridanus*)



Striped Skunk
(*Mephitis mephitis*)



Fulvous Harvest Mouse
(*Reithrodontomys fulvescens*)



Texas Mouse
(*Peromyscus attwateri*)



Rice Rat
(*Oryzomys palustris*)



Hispid Cotton rat
(*Sigmodon hispidus*)



Domestic Cat
(*Felis catus*)



Bobcat
(*Lynx rufus*)



Gray Fox
(*Urocyon cinereoargenteus*)



White-tailed deer
(*Odocoiles virginianus*)



Raccoon
(*Procyon lotor*)



Southern Flying Squirrel
(*Glaucomys volans*)

Appendix 3. Number of encounters by species and Survey method at Chickasaw National Recreation Area.

Common Name (<i>Scientific name</i>)	Number of Detections by Survey Method ^a								
	MT	PC	MN	VES	DF	TT	IN	CB	RC
Frogs and Toads									
Woodhouse's toad (<i>Bufo woodhousii</i>)	0	0	0	0	0	0	1	0	1
American Toad (<i>Bufo Americanus</i>)	0	0	0	0	0	0	0	0	3
Great Plains Narrowmouth Toad (<i>Gastrophryne olivacea</i>)	0	0	0	1	0	0	1	0	0
Gray treefrog complex (<i>Hyla Versicolor</i> and <i>H. chrysoscelis</i>).	0	0	0	0	0	0	0	0	1
Blanchard's cricket frog (<i>Acris crepitans blanchardi</i>)	0	0	0	4	0	0	0	0	2
Spotted chorus frog (<i>Pseudacris clarkii</i>)	0	0	0	0	0	0	0	0	1
Bullfrog (<i>Rana catesbeiana</i>)	0	1	0	0	1	0	1	0	0
Plains Leopard Frog (<i>Rana blairi</i>)	0	0	0	1	0	0	0	0	0
Southern Leopard Frog (<i>Rana utricularia</i>)	0	0	0	7	42	0	1	0	0
Turtles									
Common Snapping turtle (<i>Chelydra serpentina</i>)	0	0	0	0	0	7	0	0	0
Yellow Mud turtle (<i>Kinosternon flavescens</i>)	0	0	0	0	0	0	1	0	0
Mississippi Mud Turtle (<i>Kinosternon subrubrum</i>)									
Ouachita Map turtle (<i>Graptemys ouachitensis</i>)	0	0	0	1	0	0	0	0	0
Red-eared Slider (<i>Trachemys scripta elegans</i>)	0	0	0	4	0	39	0	0	0
Missouri River Cooter (<i>Pseudemys concinna metteri</i>)	0	0	0	2	0	0	1	0	0
Three-toed box turtle (<i>Terrapene carolina carolina</i>)	13	0	0	3	0	0	0	0	0
Ornate box turtle (<i>Terrapene ornata ornata</i>)	1	0	0	0	0	0	0	0	0
Eastern Spiny softshell (<i>Apalone spinifera spinifera</i>)	0	0	0	1	0	2	0	0	0
Lizards and Skinks									
Eastern Collared Lizard (<i>Crotaphytus collaris collaris</i>)	0	0	0	0	0	0	1	0	0
Fence Lizard (<i>Sceloporus undulatus</i>)	0	0	0	0	0	0	2	0	1
Texas spotted whiptail (<i>Aspidoscelis gularis gularis</i>)	0	0	0	4	0	0	0	0	1
Prairie lined racerunner (<i>Aspidoscelis sexlineatus sexlineatus</i>)	0	0	0	2	0	0	0	0	1
Ground skink (<i>Scincella lateralis</i>)	0	0	0	13	4	0	0	0	0

Appendix 3 continued

Common Name (<i>Scientific name</i>)	Number of Detections by Survey Method								
	MT	PC	MN	VES	DF	TT	IN	CB	RC
Great Blue Heron (<i>Ardea herodias</i>)	0	10	0	1	0	0	1	0	0
Great Egret (<i>Ardea alba</i>)	0	4	0	2	0	0	1	0	0
Little Blue Heron (<i>Egretta caerulea</i>)	0	0	0	0	0	0	1	0	0
Cattle Egret (<i>Bubulcus ibis</i>)	0	0	0	1	0	0	1	0	0
Green Heron (<i>Butorides virescens</i>)	0	0	0	3	0	0	0	0	0
Yellow-crowned Night Heron (<i>Nycticorax nycticorax</i>)	0	0	0	0	0	0	1	0	0
Black Vulture (<i>Coragyps atratus</i>)	0	2	0	0	0	0	0	0	0
Turkey Vulture (<i>Cathartes aura</i>)	0	10	0	0	0	0	0	0	0
Canada Goose (<i>Branta canadensis</i>)	0	0	0	0	0	0	1	0	0
Wood Duck (<i>Aix sponsa</i>)	0	2	0	1	0	0	0	0	0
Mississippi Kite (<i>Ictinia mississippiensis</i>)	0	6	0	0	0	0	1	0	0
Cooper's Hawk (<i>Accipiter cooperii</i>)	0	0	0	0	0	0	1	0	0
Red-shouldered Hawk (<i>Buteo lineatus</i>)	0	2	0	0	0	0	1	0	0
Swainson's Hawk (<i>Buteo Swansonii</i>)	0	1	0	0	0	0	0	0	0
Wild Turkey (<i>Meleagris gallopavo</i>)	0	0	0	1	0	0	1	0	0
Northern Bobwhite (<i>Colinus virginianus</i>)	0	14	0	0	0	0	0	0	0
Killdeer (<i>Charadrius vociferous</i>)	0	0	0	0	0	0	1	0	0
Spotted Sandpiper (<i>Actitis macularia</i>)	0	1	0	0	0	0	0	0	0
Least Sandpiper (<i>Calidris minutilla</i>)	0	0	0	1	0	0	0	0	0
Mourning Dove (<i>Zeniada macroura</i>)	0	0	0	0	0	0	1	0	0
Rock Dove (<i>Columba livia</i>)	0	0	0	0	0	0	1	0	0
Yellow-billed Cuckoo (<i>Coccyzus americanus</i>)	0	46	0	0	0	0	1	0	0
Greater Roadrunner (<i>Geococcyx californianus</i>)	0	0	0	0	0	0	3	0	0
Eastern Screech Owl (<i>Otus Asio</i>)	0	0	0	0	0	0	1	0	0
Great Horned Owl (<i>bubo virginianus</i>)	0	0	0	0	0	0	1	0	0
Barred Owl (<i>Strix varia</i>)	0	4	0	1	0	0	1	0	1
Common Nighthawk (<i>Chordeiles minor</i>)	0	1	0	0	0	0	1	0	0
Chuck-will's-widow (<i>Caprimulgus carolinensis</i>)	0	0	1	0	0	0	0	0	0
Chimney Swift (<i>Chaetura pelagica</i>)	0	3	0	0	0	0	0	0	0
Ruby-throated Hummingbird (<i>Archilochus colubris</i>)	0	3	0	0	0	0	0	0	0
Belted Kingfisher (<i>Ceryle alcyon</i>)	0	1	0	2	0	0	1	0	0
Red-headed Woodpecker (<i>Melanerpes erythrocephalus</i>)	0	0	0	0	0	0	1	0	0

Appendix 3 continued

Common Name (<i>Scientific name</i>)	Number of Detections by Survey Method								
	MT	PC	MN	VES	DF	TT	IN	CB	RC
Red-bellied Woodpecker (<i>Melanerpes carolinus</i>)	0	29	0	0	0	0	0	0	0
Downy Woodpecker (<i>Picoides pubescens</i>)	0	9	0	0	0	0	0	0	0
Hairy Woodpecker (<i>Picoides villosus</i>)	0	2	0	0	0	0	0	0	0
Northern Flicker (<i>Colaptes auratus</i>)	0	4	0	0	0	0	1	0	0
Pileated Woodpecker (<i>Dryocopus pileatus</i>)	0	5	0	1	0	0	0	0	0
Eastern Wood-peewee (<i>Contopus virens</i>)	0	1	0	0	0	0	0	0	0
Eastern Phoebe (<i>Sayornis phoebe</i>)	0	5	0	0	0	0	0	0	0
Western Kingbird (<i>Tyrannus verticalis</i>)	0	1	0	0	0	0	0	0	0
Great-crested Flycatcher (<i>Myiarchus crinitus</i>)	0	37	0	0	0	0	0	0	0
Scissor-tailed Flycatcher (<i>Tyrannus forficatus</i>)	0	1	0	0	0	0	1	0	0
Blue Jay (<i>Cyanocitta cristata</i>)	0	35	0	0	0	0	0	0	0
American Crow (<i>Corvus brachyrhynchos</i>)	0	69	0	0	0	0	0	0	0
Purple Martin (<i>Progne subis</i>)	0	6	0	0	0	0	0	0	0
Northern Rough-winged Swallow (<i>Stelgidopteryx serripennis</i>)	0	1	0	0	0	0	1	0	0
Cliff Swallow (<i>Petrochelidon pyrrhonota</i>)	0	0	0	0	0	0	1	0	0
Barn Swallow (<i>Hirundo rustica</i>)	0	5	0	0	0	0	0	0	0
Carolina Chickadee (<i>Poecile carolinensis</i>)	0	67	0	0	0	0	0	0	0
Tufted titmouse (<i>Baeolophus bicolor</i>)	0	73	0	0	0	0	0	0	0
White-breasted nuthatch (<i>Sitta carolinensis</i>)	0	0	0	0	0	0	1	0	0
Carolina Wren (<i>Thryothorus ludovician us</i>)	0	28	0	0	0	0	1	0	0
Bewick's Wren (<i>Thryomanes bewickii</i>)	0	10	0	0	0	0	1	0	0
Blue-gray Gnatcatcher (<i>Polioptila nigriceps</i>)	0	60	0	0	0	0	1	0	0
Swainson's Thrush (<i>Catharus ustulatus</i>)	0	0	0	0	0	0	1	0	0
American Robin (<i>Turdus migratorius</i>)	0	9	0	0	0	0	0	0	0
Eastern Bluebird (<i>Sialia sialis</i>)	0	0	0	0	0	0	1	0	0
Gray Catbird (<i>Dumetella carolinensis</i>)	0	1	0	0	0	0	1	0	0
Northern Mockingbird (<i>Mimus polyglottus</i>)	0	1	0	0	0	0	0	0	0
Brown Thrasher (<i>Toxostoma rufum</i>)	0	7	0	0	0	0	0	0	0
European Starling (<i>Sturnus vulgaris</i>)	0	3	0	0	0	0	1	0	0
White-eyed Vireo (<i>Vireo griseus</i>)	0	22	0	0	0	0	0	0	0
Red-eyed Vireo (<i>Vireo olivaceus</i>)	0	30	0	0	0	0	0	0	0
Northern Parula (<i>Parula Americana</i>)	0	1	0	0	0	0	0	0	0

Appendix 3 continued

Common Name (<i>Scientific name</i>)	Number of Detections by Survey Method								
	MT	PC	MN	VES	DF	TT	IN	CB	RC
Yellow Warbler (<i>Dendroica petechia</i>)	0	2	0	0	0	0	0	0	0
Black-and-white Warbler (<i>Mniotilta varia</i>)	0	8	0	0	0	0	0	0	0
Prothonotary Warbler (<i>Protonotaria citrea</i>)	0	1	0	0	0	0	0	0	0
Louisiana Waterthrush (<i>Seiurus motacilla</i>)	0	1	0	0	0	0	0	0	0
Yellow-throated Warbler (<i>Dendroica dominica</i>)	0	1	0	0	0	0	0	0	0
Summer Tanager (<i>Piranga rubra</i>)	0	11	0	0	0	0	0	0	0
Field Sparrow (<i>Spizella pusilla</i>)	0	56	0	0	0	0	0	0	0
Lark Sparrow (<i>Chodestes grammacus</i>)	0	2	0	0	0	0	0	0	0
Northern Cardinal (<i>Cardinalis Cardinalis</i>)	0	157	0	0	0	0	0	0	0
Indigo Bunting (<i>Passerina cyanea</i>)	0	42	0	0	0	0	0	0	0
Painted Bunting (<i>Passerina ciris</i>)	0	80	0	0	0	0	0	0	0
Dickcissel (<i>Spiza Americana</i>)	0	3	0	0	0	0	0	0	0
Red-winged Blackbird (<i>Agelaius phoeniceus</i>)	0	12	0	0	0	0	0	0	0
Brown-headed Cowbird (<i>Molothrus ater</i>)	0	59	0	0	0	0	0	0	0
Eastern Meadowlark (<i>Sturnella magna</i>)	0	3	0	0	0	0	0	0	0
Common Grackle (<i>Quiscalus quiscula</i>)	0	9	0	0	0	0	0	0	0
Great-tailed Grackle (<i>Quiscalus major</i>)	0	1	0	0	0	0	0	0	0
American Goldfinch (<i>Carduelis tristis</i>)	0	0	0	0	0	0	1	0	0
House Sparrow (<i>Passer domesticus</i>)	0	2	0	0	0	0	0	0	0
Mammals									
Armadillo (<i>Dasypus novemcinctus</i>)	1	0	0	0	0	0	0	0	7
Virginia Opossum (<i>Didelphis virginianus</i>)	20	0	0	0	0	0	0	0	6
Raccoon (<i>Procyon Lotor</i>)	11	0	0	1	0	0	0	0	9
Eastern pipistrel (<i>Pipistrellus subflavus</i>)	0	0	11	0	0	0	0	0	0
Red Bat (<i>Lasiurus borealis</i>)	0	0	8	0	0	0	0	0	0
Evening Bat (<i>Nycticeus humeralis</i>)	0	0	14	0	0	0	0	0	0
Eastern Cottontail (<i>Sylvilagus floridanus</i>)	1	0	0	0	0	0	0	0	6
Striped Skunk (<i>Mephitis mephitis</i>)	3	0	0	0	0	0	0	0	3
Fox Squirrel (<i>Sciurus niger</i>)	0	0	11	0	0	0	1	0	0
Southern Flying Squirrel (<i>Glaucomys volens</i>)	0	0	1	0	0	0	0	0	0

Appendix 3 continued

Common Name (<i>Scientific name</i>)	Number of Detections by Survey Method								
	MT	PC	MN	VES	DF	TT	IN	CB	RC
Beaver (<i>Castor Canadensis</i>)	0	0	0	0	0	0	1	0	1
Fulvous Harvest Mouse (<i>Reithrodontomys fulvescens</i>)	4	0	0	0	0	0	0	0	0
Texas Mouse (<i>Peromyscus attwateri</i>)	195	0	0	0	0	0	0	2	0
White-footed mouse (<i>Peromyscus leucopus</i>)	15	0	0	0	0	0	0	0	0
Deer mouse (<i>Peromyscus maniculatus</i>)	15	0	0	0	0	0	0	0	0
Rice Rat (<i>Oryzomys palustris</i>)	2	0	0	0	0	0	0	0	0
Hispid Cotton rat (<i>Sigmodon hispidus</i>)	145	0	0	0	0	0	0	1	0
Eastern woodrat (<i>Neotoma floridana</i>)	65	0	0	0	0	0	0	0	0
Coyote (<i>Canis latrans</i>)	0	0	0	0	0	0	0	0	1
Gray Fox (<i>Urocyon cinereoargenteus</i>)	0	0	0	0	0	0	0	0	9
White-tailed deer (<i>Odocoiles virginianus</i>)	0	0	0	0	0	0	0	0	4
Bobcat (<i>Lynx rufus</i>)	0	0	0	0	0	0	1	0	0
Domestic cat (<i>Felis catus</i>)	4	0	0	0	0	0	0	0	3

a survey methods were: Mammal trapping = MT; point counts = PC; mist-netting = MN, visual encounter surveys = VES; drift fences = DF; turtle traps = TT; incidental observations = IN, cover boards = CB; and road cruising = RC.